CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NUMBER 93-111
RESCINDING ORDER NO. 91-165

REVISED SITE CLEANUP REQUIREMENTS FOR:

HEXCEL CORPORATION 10 TREVARNO ROAD LIVERMORE ALAMEDA COUNTY	HEXCEL CORPORATION, DONALD AND SUZANNE SMITH, AND F&P PROPERTIES ABANDONED DISPOSAL UNIT, NORTH MINES ROAD LIVERMORE ALAMEDA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter called the Board) finds that:

1. SITE LOCATION AND DESCRIPTION:

1.1 This Order presents the selected final remedy for the Hexcel Superfund Site (the "Site"). Consistent with the National Contingency Plan ("NCP") policy (see 40 C.F.R. § 300.430(a)(1)(ii)) for purposes of remedy selection and remedial planning, the Site has been separately divided into the "Hexcel Composite Materials Manufacturing Plant Operable Unit (HMP OU)" and "Abandoned Disposal Site Operable Unit (ADS OU)". The HMP OU is located at 10 Trevarno Road, Livermore, Alameda County (Figure 1). The ADS OU is located at the southerly end of North Mines Road. The Site is located in the Livermore region of the Amador-Livermore Valley, on a gently north-sloping plain broadly bounded by Arroyo Mocho to the southwest, Arroyo Seco to the east, and I-580, the Spring Basin and Arroyo Las Positas to the north. This area was primarily agricultural and grazing lands but is now comprised primarily of residential and industrial property development. Residential developments are separated from the HMP OU by vacant land. Residential developments are separated from the ADS OU by the railroad right-of-way.

1.2 The ADS OU is about 3,000 feet long by 400 feet wide. It is an unlined site, which has received waste disposal without authorization from this Board. The existing cover is inadequate for appropriate surface drainage and surface development. The wastes may contain pollutants, which under ambient environmental conditions, could be released at concentrations which could cause degradation of waters of the State.

2. SITE HISTORY

2.1 HMP OU

2.1.1 Coast Manufacturing & Supply Company (CMS) constructed the first manufacturing facility at the HMP OU in 1912, CMS manufactured: black powder safety fuse between 1912 and 1968; resin-impregnated glass cloth products between 1948 and 1968; and detonation cord containing pentaethrytol tetranitrate (PETN) between about 1966 and 1968.

2.1.2 Hexcel Corporation purchased the CMS Plastics Division in 1968. Production of fuse and explosives-related products ceased at that time. The equipment used in the fuse and explosives manufacturing processes was purchased by the Apache Powder Company, dismantled, and removed from the HMP OU. During dismantling of the equipment, Apache Powder may have deposited debris in the ADS OU. Hexcel has operated the Composite Materials Plant at the Site since 1968 for the manufacture of composite materials used in aerospace and other structural applications. The manufacturing process involves impregnation of various fabrics with resins to produce a rigid structure.

2.1.3 Two documented chemical releases at the HMP OU have been reported. On February 15, 1983, approximately 600 gallons of solvent AP-92 (consisting of 74% methylene chloride, 12% isopropanol, 11% dimethyl formamide, and 4% methyl ethyl ketone) were spilled from a transfer line leading to Tank G south of Building 19. A second spill on April 20, 1983 involved approximately 1200 gallons of methyl ethyl ketone (MEK) which were released inside Building 19 after a valve was inadvertently left open. Approximately 700 gallons flowed out of the building onto the grounds surrounding Building 19. The remaining 500 gallons were recovered inside the building on the day of the spill. The constituents detected in the subsurface at the HMP OU consisted largely of acetone, MEK, toluene, butyl alcohol, dimethyl formamide (DMF) and dichloromethane (DCM) originating from the two accidental spills. After the spill, site-specific cleanup was undertaken immediately.

2.2 ADS OU

2.2.1 The area of the ADS OU has been in use since 1906, when this was used as a borrow site by the Western Pacific and Union Pacific Railroads for construction of the two adjacent and enclosing parallel railroad embankments. Disposal of various solid and liquid wastes took place within the ADS. Investigations have detected buried waste in the western third of the property. The property including the ADS may have been owned by the Palmer McBride Company until 1940.

2.2.2 CMS, Hexcel's predecessor at the HMP OU, purchased the area of the borrow pit in 1940. Hexcel purchased the manufacturing plant and the ADS from CMS in 1968.

2.2.3 A domestic sewage drain field was constructed in 1955 in the southwest quarter of the ADS. Industrial and domestic sewage was treated (via Hoffman Tank, thought to be an anaerobic digester) and then drained into a series of three eastward cascading evaporation ponds. The volume, consisting mostly of non-contact process cooling water, ranged from between 2,500 gpd in 1958 to 24,000 gpd in the mid-1970s. The Regional Board and Alameda County Flood Control District, Zone 7 began monitoring the leach field area as early as 1959. Sewage disposal continued until 1977, when Hexcel connected the sewage out-fall to the municipal sewer system.

2.2.4 Hexcel sold the property which contained the former borrow pit, waste disposal site and sewage drain field to Donald W. and Suzanne T. Smith in March, 1979. During the Smith's ownership of the property additional wastes were disposed of at the Site. The Smiths sold the property to F&P Properties, the current owners, in 1985.

2.2.5 The wastes that may have been disposed of at the ADS fall into five general categories:

- General plant refuse
- Employee refuse
- Industrial and chemical wastes
- Sewage wastes
- General household trash and construction debris.

2.2.6 Activities at the ADS OU subsequent to Hexcel's ownership have included disposal of domestic or commercial trash, and leakage or drainage of lubricating oil, hydraulic fluid and coolants from vehicles stored on the ADS OU . Discharges from truck repair and painting activities have occurred at and near Jag's Diesel. In addition, the central portion of the ADS OU is currently used by Mountain Cascade, Inc. for storage of construction materials and heavy construction vehicles. The construction materials observed to be present on the ADS OU include iron pipe, PVC pipe, concrete asbestos pipe, concrete pipe, culverts, and manholes. Trash, including lumber, cardboard, automobile batteries, and used oil filters were present in a depression near the center of the Site in 1991.

2.2.7 The western portion of the ADS OU is occupied by Jag's Diesel, an active business that performs various truck repairs including painting. The area immediately to the east of Jag's Diesel is used for storage of Jag's Diesel's salvaged truck bodies.

3. Dischargers

3.1 HMP OU

3.1.1 Hexcel is named as a discharger because of their ownership and operation of the

HMP OU and the documented discharges which occurred during the period of Hexcel's ownership (see 2.1, Site History).

3.2 ADS OU

3.2.1 Hexcel, the Smiths and F&P are named as dischargers of the ADS OU because of their ownership of the property during which time discharge(s) occurred (see 2.2, Site History).

4. HYDROGEOLOGY

4.1 Groundwater supplies within the Livermore Valley are derived principally from sand and gravel units within the Quaternary Alluvium and the Livermore Formation. One-third of the City of Livermore's municipal drinking water consists of groundwater pumped from zones at depths of 250-feet or greater, and the other two-thirds consists of imported water. The closest public water supply well is approximately 3600 feet upgradient from the Site and produces from water-bearing units at least 200 feet below the deepest unit in which chemicals have been detected at the Site .

4.2 The principal waterbearing units at the Site are alluvial sediments of Quaternary and possibly Pleistocene age that occur between the surface and a depth of about 50 feet. These alluvial deposits contain a complex sequence of lenticular sands, gravels, silts, and clay. Five informal lithologic units have been described at the Site , termed the Unsaturated Fine-Grained Zone ("UFGZ"), Upper Transmissive Unit ("UTU"), Middle Aquitard ("MA"), Middle Transmissive Unit ("MTU"), and Lower Aquitard ("LA"). The most permeable units are sand and gravel zones of the UTU and MTU that vary from six inches to about thirty feet in thickness. These shallow alluvial sediments within one-half mile of the Site are not presently used for water supplies.

4.3 Transmissive units as deep as seven hundred feet are also present within the Livermore Formation and are tapped by CMS's former fire suppression system wells #5 and #6 located along the southeastern boundary of the HMP OU. These wells tap a water supply aquifer for the City of Livermore. These deep confined water-bearing zones are separated from the shallow aquifers by dense clays of the Livermore Formation. At the present time, the potentiometric surface in the deep water-bearing zones of the Livermore may be slightly higher than that in the alluvium.

4.4 Groundwater occurs at a depth of about fifteen feet at both the HMP and ADS OUs. The general direction of groundwater flow is toward the north and is influenced by remedial groundwater pumping at Intel. No water supply wells are known to use these shallow water-bearing units within one-half mile of the Site .

5. SURFACE WATER

5.1 HMP OU The Hexcel plant lies about 535 feet above mean sea level on an alluvial surface which slopes gently to the northwest at about fifty feet per mile. The land surface within the Site is relatively flat and there are no clearly-defined channels. Most runoff flows northward toward the railroad tracks and then west along the right-of-way to Arroyo Seco, which is part of the City of Livermore's flood control system.

5.2 ADS OU Most of the ADS OU is characterized by internal drainage. Runoff accumulates in closed depressions; where most of it evaporates. The only runoff that leaves the ADS OU (which is covered by clean fill) enters Arroyo Seco from the eastern portion of the ADS OU.

6. SOIL AND GROUNDWATER INVESTIGATIONS

6.1 HMP OU

6.1.1 Several site assessment investigations have been performed at the HMP OU since 1983 under the direction of the Board. These investigations have focused on the area around Building 19 and the chemical compounds involved in the two documented solvent spills.

6.1.2 Remedial Investigation (RI) activities performed at the HMP OU between May and December 1991 included:

1. An investigation of surface features in the Site;
2. A soil gas investigation;
3. Confirmatory drilling and soil sampling;
4. Sampling of existing groundwater monitoring wells;
5. Installation of new wells near the property boundary;
6. Characterization of hydrogeologic properties; and
7. Interim remedial actions.

6.1.3 Quarterly groundwater monitoring has been performed at the HMP OU since 1991. An investigation of the extent of an area in which PCE was detected to the north and west of the HMP OU was performed, at the request of the Board, in March 1993 and the results reported to the Board in the first Quarterly Report of 1993.

6.2 ADS OU

6.2.1 Initial site assessment activities began in 1985, with site history and background reports prepared for Hexcel by Aqua Terra. In 1986, a Phase I field investigation was performed for Hexcel by Hydro Geo Chem under the direction of the Board. A Phase II investigation was performed in 1988 by Hydro Geo Chem, also under the direction of the Board. In connection with F&P's proposed property development, a geotechnical and soil pollutant investigation was performed in 1988 by BSK &

Associates. BSK & Associates performed a geotechnical and environmental assessment focusing on the western third of the ADS in April and May 1989. This investigation included test hole drilling, geophysical surveys, and chemical sampling and analyses.

6.2.2 RI activities were performed during the period from November 1991 through March 1992. These activities consisted of:

1. An investigation of surface features in the Site;
2. A soil gas investigation;
3. Confirmatory drilling and soil sampling;
4. Sampling of existing monitoring wells;
5. Installation of new wells; and
6. Characterization of hydrogeologic properties.

6.2.3 A quarterly water level and groundwater monitoring program was begun in February 1989. Monitoring continued through June 1990, when it was suspended pending resolution of the National Priority List status of the Site. Quarterly groundwater monitoring was resumed in March 1992. An investigation of methane concentrations in soil along the perimeter of the ADS OU was performed, at the request of the Board, in March 1993 and the results were reported to the Board in April 1993.

7. DETECTION OF CHEMICALS IN SOIL

7.1 HMP OU

7.1.1 The following chemicals have been detected in the subsurface at the HMP OU at concentrations greater than 1 ppm. The maximum concentration were found in one soil sample from a depth of 5 feet below surface: acetone (36,000 ppm) and methyl ethyl ketone (MEK) (83,000 ppm), and another soil sample from a depth of 30 feet below surface: benzene (1,000 ppm), toluene (75,000 ppm), ethylbenzene (44,000 ppm), xylenes (190,000 ppm), phenol (2,900 ppm), methyl benzene (140,000 ppm), and naphthalene (5,500 ppm). Acetone, MEK and benzene were detected in the vicinity of the Bldg. 19 spill and near the former Recycle Pad on the north side of Bldg. 101. Toluene, ethylbenzene, xylenes, methyl benzene and naphthalene are components of gasoline and other petroleum hydrocarbons. These constituents were detected in soil at concentrations exceeding 1 ppm in the vicinity of a suspected gasoline spill or leaking underground storage tank on the north side of Bldg. 101. Phenol was detected in one soil sample near Bldg. 19.

7.2 ADS OU

7.2.1 No volatile organic compounds were detected in soil samples during the RI at concentrations greater than 1 ppm. Acetone was detected in samples from borings in the vicinity of the former sewage lagoons at concentrations less than 100 ppb.

7.2.2 Three semi-volatile compounds, dibenzofuran, fluorene, and phenanthrene, were detected at concentrations of 3000 ppb, 2800 ppb, and 17000 ppb, respectively, in one surface soil sample collected near Jag's Diesel. These compounds are polyaromatic hydrocarbons often associated with used motor oil.

7.2.3 Bis(2-ethylhexyl)phthalate was the only semi-volatile priority pollutant detected in soil samples analyzed prior to the RI. This compound was detected in boring EB-3 at 1100 ppb, boring L-2 at 460 ppb, and in L-3 at 230 ppb.

7.2.4 Copper, zinc, and nickel were metals detected in soils at concentrations which may be higher than background. The maximum concentrations of these metals were all detected in soil samples from P-14 on the north side of Jag's Diesel.

7.2.5 The following constituents were detected in an extractant liquid from a sample of resin taken from the former Resin Pit that was analyzed by the toxic characteristic leach procedure (TCLP):

Barium	0.644 mg/l
Lead	0.425 mg/l
Cadmium	0.076 mg/l
Total Chromium	0.011 mg/l

7.2.6 Methane was detected in soil gas samples collected throughout the central portion of the ADS. The highest methane concentrations were found in the vicinity of the former solid waste disposal area in the 15-foot samples which were collected close to the saturated zone. Concentrations in this area ranged from less than 1.5 part per million volume (ppmv) to 190,000 ppmv. Soil gas samples collected along the perimeter of the ADS OU in March 1993, contained only very low concentrations of methane (less than 75 ppmv gas).

8. DETECTION OF CHEMICALS IN GROUNDWATER

8.1 HMP OU

8.1.1 Fifteen volatile organic compounds and five semi-volatile compounds were detected during the RI. Two volatile compounds, carbon disulfide and 1,2 dichlorobenzene, were detected only once and at concentrations of 3 and 5 ppb, respectively. Other volatile organic compounds detected in groundwater during the RI at the HMP included vinyl chloride (maximum 5 ppb), methylene chloride (maximum 62 ppb), 1,1 dichloroethane (maximum 10 ppb), t-1,2 dichloroethene (maximum 3 ppb), c-1,2 dichloroethene (maximum 26 ppb), trichloroethene (maximum 3 ppb), tetrachloroethene (maximum 74 ppb), acetone (maximum 6600 ppb), methyl ethyl ketone (maximum 24,000 ppb), vinyl acetate (maximum 13 ppb), benzene (maximum 120 ppb), toluene (maximum 760 ppb), ethylbenzene (maximum 130 ppb), and xylenes

(maximum 310 ppb).

8.1.2 Semi-volatile compounds detected were phenol (maximum 3 ppb), 2-methyl phenol (maximum 8 ppb), 4-methyl phenol (maximum 28 ppb), 4 chloroaniline (maximum 8 ppb), and methyl benzene (maximum 198 ppb).

8.1.3 The non-chlorinated solvents detected in groundwater were acetone, MEK and toluene. Toluene is also a fuel hydrocarbon constituent. The highest concentrations of these constituents were detected in well M-3 which is in the area affected by the Building 19 solvent spills. Lower concentrations were detected in well B1007 which is near the Recycle Pad and in an area where chemicals have been detected in soil.

8.1.4 Six chlorinated volatile organic compounds have been detected in groundwater at the HMP OU during the RI. In order of decreasing maximum concentration, these are: tetrachloroethene (PCE) (74 ppb), methylene chloride (38 ppb), cis-1,2 dichloroethene (26 ppb), 1,1 dichloroethane (10 ppb), trans-1,2 dichloroethene (3 ppb), and trichloroethene (3 ppb). With the exception of methylene chloride, chlorinated volatile compounds were detected only in samples from wells HEX-13S, HEX-13M, and HEX-14S. Methylene chloride was detected in samples from wells M-1, M-3, and M-5 near Building 19.

8.1.5 PCE was detected in well HEX-14S at a concentration of 74 ppb during July 1991, and at 34 ppb in November 1991. PCE was detected in an area extending northwest from the HMP OU in March, 1993. The concentrations of PCE in that area range from about 20 ppb down to less than 5 ppb. TCE was detected at 3 ppb in only the first sample from this well.

8.1.6 Volatile fuel hydrocarbon constituents detected in groundwater consist of benzene, ethyl benzene, toluene, and xylenes (BTEX). The highest concentrations of these constituents were detected in well B1007. Toluene and xylenes were detected in well M-3 near Building 19. Benzene has been detected sporadically at concentrations ranging from 5 to 10 ppb in other monitoring wells near Building 19.

8.1.7 Five semi-volatile priority pollutants have been detected in groundwater samples from the HMP OU. In order of decreasing maximum concentration, these are: toluene (198 ppb), 4-methyl phenol (28 ppb), 4-chloroaniline (8 ppb), 2-methyl phenol (8 ppb), and phenol (3 ppb). The phenols were detected in wells M-3 and B1007 at concentrations of less than 10 ppb.

8.1.8 4-chloroaniline was detected in wells M-3, M-7, and HEX-5 near Building 19 at concentrations ranging from 3 to 8 ppb.

8.1.9 Seven priority metals were detected in groundwater samples from the HMP OU. In order of decreasing maximum concentration, these are: nickel (2960 ppb) ,barium

(1640 ppb), zinc (629 ppb), arsenic (112 ppb), and total chromium (29 ppb). The maximum barium and arsenic concentrations occur in wells near Bldg. 19. The other metals were detected in well HEX-13S.

8.2 ADS OU

8.2.1 The volatile compounds detected in groundwater samples collected during the Phase I and II investigations and quarterly monitoring prior to June 1991, included benzene, toluene, xylenes, and some chlorinated compounds. Concentrations of the detected aromatic and halogenated organic compounds were typically less than 10 ppb with the exception of 1,2 dichloroethane which was detected in P-3 in the 50 to 60 ppb range.

8.2.2 No volatile or semi-volatile compounds were detected in water samples collected and analyzed during the RI in 1991. Acetone was detected at 200 ppb in one water sample analysis from well P-11 during quarterly monitoring subsequent to the RI in June 1992. Chloroform was detected at 2 ppb in one sample from well P-14 in June 1992. Well P-14 has been sampled since June 1992; no chloroform has been detected in samples taken subsequent to June 1992.

8.2.3 Bis(2-ethylhexyl)-phthalate has been detected sporadically in groundwater samples collected subsequent to the RI at a maximum concentration of 22 ppb.

8.2.4 The following seven priority pollutant metals were detected in water samples collected during the RI and subsequent to the RI: arsenic (maximum concentration 51 ppb); barium (1520 ppb); chromium (total 15 ppb and hexavalent 11 ppb); lead (7 ppb); nickel (61 ppb); and zinc (68 ppb). Only barium and arsenic have been detected consistently.

8.3 Other Sites

8.3.1 Two other sites adjacent to the ADS OU are known to have groundwater pollution. They are: Intel Corporation Fab III facility about 300 feet northwest from the west edge of the ADS OU, and, the former Industrial Ladder facility (Calico Lumber and Supply) about 100 feet to the north of the ADS OU.

9. REPORTS AND STUDIES

9.1 HMP OU REMEDIAL INVESTIGATION/FEASIBILITY STUDY/FINAL RAP

Hexcel submitted a Remedial Investigation (RI) report to the Board and EPA on April 23, 1992. On June 30, 1993, Hexcel submitted a Feasibility Study (FS) satisfying the requirements of Order No. 91-165. Board staff found both the RI and FS acceptable. The Proposed Plan (Cleanup Plan Proposed for Hexcel Superfund Site) contained the proposed

final remedy for the HMP OU. The technical information contained in the RI, the FS, and the Proposed Plan is consistent with the requirements of Section 25356.1 of the California Health and Safety Code for RAPs and with the requirements of the National Contingency Plan (NCP) for RIs and FSs. The final RAP for the HMP OU consists of this Order, the RI, the FS, and the Proposed Plan.

9.2 ADS OU REMEDIAL INVESTIGATION/FEASIBILITY STUDY/FINAL RAP, ADS OU

Hexcel submitted an RI Report to the Board and EPA on May 15, 1992. On June 30, 1993, Hexcel submitted an FS satisfying the requirements of Order 91-165. Board staff found both the RI and FS acceptable. The Proposed Plan (Cleanup Plan Proposed for Hexcel Superfund Site) contained the proposed final remedy for the ADS OU. The technical information contained in the RI, the FS, and the Proposed Plan is consistent with the requirements of Section 25356.1 of the California Health and Safety Code for RAPs and with the requirements of the National Contingency Plan (NCP) for Ris and Fss. The final RAP for the ADS OU consists of this Order, the RI, the FS, and the Proposed Plan.

9.3 RISK ASSESSMENT

EPA Region 9 prepared a Screening Risk Assessment (SRA) dated April 21, 1993. Certain risk calculations have been updated to represent the best, currently available data on site conditions.

9.3.1 Contaminants of Concern

Contaminants of concern (COCs) are those chemicals identified as being most likely to contribute significantly to Site risk. The COCs for the Site were selected from those potentially toxic chemicals that were detected in soil or groundwater at concentrations above background levels and in more than 5% of the samples analyzed. EPA selected the COCs from the analyses reported in the RI reports for the HMP OU and the ADS OU. Based on a pathway analysis that identified potential exposure to contaminated groundwater as being the principal health risk, the following COCs detected in groundwater were selected; arsenic, barium, acetone, MEK, benzene, and PCE. The presence of methane in portions of the ADS OU was also identified as posing a potential physical risk through the possibility of explosion if it accumulated in confined spaces such as buildings.

9.3.2 Toxicity Assessment

9.3.2.1 The COCs were evaluated for potential noncarcinogenic and carcinogenic toxicity through groundwater ingestion. The hazard quotient is the ratio of the maximum concentration of the substance detected in groundwater at either the HMP or

ADS OU to the EPA toxicity value. Hazard quotients of less than 1 indicate that routine consumption of water containing the substance at the maximum concentration is likely to be without appreciable health risk.

9.3.2.2 Benzene and PCE were the only COCs identified in the SRA as a carcinogens. The toxicity values are for drinking water concentration associated with a one in a million risk of developing cancer over a 70 year exposure.

9.3.3 Exposure Assessment.

9.3.3.1 Soils: The SRA found that the surface soil concentrations were mostly at or below background concentrations (for inorganic constituents) and below human health effect thresholds (organics and inorganics) at both the HMP and ADS Ous. For this reason, no COCs were identified for soils. COCs in the subsurface soil may contribute to groundwater contamination in some areas at the HMP OU. The SRA also identified potential physical hazards associated with methane and buried materials in the ADS OU.

9.3.3.2 Groundwater: The SRA assessed the dominant Site risk of ingestion of contaminated groundwater. The hazard quotients are estimates of the non-carcinogenic risk of long-term consumption of groundwater that contains the maximum concentrations of the COCs detected at the HMP OU. Hazard quotients greater than 1 indicate that the concentrations in groundwater may pose a health concern. Arsenic, acetone, and MEK are in this category. Acetone and MEK were detected in groundwater at the HMP OU only. Arsenic was detected in several wells in the Bldg. 19 area at the HMP OU and in one well at the ADS OU. Barium and PCE have hazard quotients of less than 1.

9.3.3.3 Based on the maximum concentrations found in groundwater during the investigations, the hazard quotient for all COCs is 23.9. Based on the average groundwater concentrations, the hazard quotient for all COCs is 1.6.

9.3.3.4 The cancer risk of 1×10^{-4} is an estimate of the upper-bound probability of an individual developing cancer as a result of drinking water for 70 years with the maximum concentration of benzene detected at the HMP OU. The excess cancer risk for the PCE is 1×10^{-4}. Benzene and PCE were not detected in groundwater samples collected at the ADS OU either during or subsequent to the RI.

9.3.4 Summary of Potential Health Risks

9.3.4.1 The Site 's future potential risk to human health was assessed by evaluating the exposure to drinking water derived from the Upper and Middle transmissive zones.

9.3.4.2 As stated in the SRA, the selection of the drinking water scenario may serve to underestimate the site risk, as domestic use of water would also include showering,

cooking, and recreational uses such as swimming. However, ingestion would be the most dominant and frequent exposure scenario.

9.3.4.3 The SRA identified arsenic and MEK as the primary contaminants of concern because their maximum concentrations exceeded the hazard quotient threshold of 1 for systemic deleterious effects to adult residential receptors. The calculations presented in the FS indicate that the hazard quotient for acetone also exceeds 1. The cancer risk associated with ingestion of benzene and PCE at the maximum concentration detected at the HMP OU was calculated to be 1×10^{-4}.

9.3.4.4 Potential physical hazards identified at the ADS OU were: the accumulation of explosive concentrations of methane developing in on-site or off-site buildings, and the excavation of buried materials in the landfill.

10. REGULATORY STATUS

10.1 The HMP OU was included on the National Priorities List (NPL) in August 1990 (55 FR 35502). Activities conducted at the HMP OU since that time have been performed pursuant to Superfund guidelines.

10.2. In March, 1991 (letter dated March 6, 1991), EPA concluded that the ADS is part of the NPL Site ("facility"), which is defined as "any site or area where a hazardous substance has been deposited, stored, disposed of, or placed, or otherwise come to be located".

10.3 The Board is lead agency for the Ous and will continue to regulate the dischargers' investigation and remediation work and administer enforcement actions in accordance with CERCLA as amended by SARA (Superfund) based upon the South Bay Multi-Site Cooperative Agreement between EPA and the Board.

10.4 Hexcel has filed a petition in the U.S. Court of Appeals for the District of Columbia Circuit requesting that the Court order EPA to remove the Hexcel Superfund Site from the NPL. Should Hexcel prevail in its petition, the Board will retain lead for oversight.

10.5 Investigations at the HMP OU were required by Order 90-074 and investigations at the ADS OU were required by Order 90-121. Order 91-165, which rescinded Orders 90-074 and 90-121, applied to both the HMP OU and ADS OU.

10.6 Hexcel has submitted the following documents, for both Ous, which have been deemed acceptable by Board staff: Comprehensive Data Summary, Sampling and Analysis Plan, Health and Safety Plan, RI/FS Work Plan, Data Validation Package, the Administrative Record, the RI and FS Reports for the HMP OU and ADS OU, Quarterly Technical Compliance reports, and the Off-Site Methane Survey report.

11. BOARD ENFORCEMENT HISTORY

The following Board Orders have applied to conditions at the Site:

- Cleanup and Abatement Order No. 83-003 (Hexcel Plant)
- Site Cleanup Requirements Order No. 90-074 (HMP OU)
- Site Cleanup Requirements Order No. 90-121 (ADS OU)
- Site Cleanup Requirements Order No.91-165 (HMP OU and ADS OU)

12. INTERIM REMEDIAL ACTIONS

12.1 HMP OU

12.1.1 The initial remediation of the spills that occurred in 1983 near Bldg. 19 consisted of removal of soil known to be contaminated and installation of a temporary well to recover groundwater containing methylene chloride. Well HEX-10 was installed in 1985 to recover additional groundwater affected by the Bldg. 19 spill. A treatability study was performed in 1986 to determine the capacity of the Livermore POTW to handle groundwater discharged from the recovery well. Approximately 800,000 gallons of water were pumped from this well between February and April, 1987. The water was discharged to the Livermore POTW under Hexcel's industrial discharge permit. Remedial pumping of groundwater from Well HEX-10 has taken place periodically since 1987 and is also discharged under the industrial discharge permit to the City of Livermore's sewer system.

12.1.2 Soils containing acetone and MEK were removed from the Recycle Pad near Bldg. 101 in 1991. These soils were excavated to a depth of approximately 5 feet under a work plan approved by the Board. Prior to the RI, Hexcel excavated soils with Bunker C fuel oil during removal of a waste holding tank. These soils were stockpiled and sampled during the RI. They were found to contain MEK (27 ppb in one sample), toluene (maximum 35 ppb), xylene (maximum 4 ppb), and bis(2-ethylhexyl)phthalate (160 ppb in one sample).

12.2 ADS OU

Hexcel has not conducted any interim remedial actions at the ADS OU.

13. SCOPE OF THIS ORDER

This Order presents the selected final remedies for the HMP OU and ADS OU as described in 14.1.4 and 14.2.2. respectively. This Order also sets forth a task and time

schedule for submittal of documents required for design and implementation of the remedies.

14. REMEDIATION ALTERNATIVES CONSIDERED

14.1 HMP OU

Six alternatives, including the no-action alternative, were developed and evaluated for the HMP OU.

14.1.1 Alternative 1: No Action

Alternative 1 is no remedial action and no monitoring. In essence, this alternative implies that the only change in soil and groundwater concentrations from current conditions will be as a result of natural processes and human activities, such as remedial pumping at the Intel Fab III facility, that are outside of the control of current property owners.

14.1.2 Alternative 2: Monitoring/Deed Restriction

Alternative 2 consists of monitoring and deed restrictions on groundwater uses. It also includes additional investigations to further delineate the area of groundwater containing PCE. Activities in specific areas are discussed below.

14.1.2.1 Bldg. 19 Area: Alternative 2 for Bldg. 19 area consists of a deed restriction on use of groundwater beneath the Hexcel Plant Site for human consumption and continued monitoring of the area around Bldg. 19 on a semi-annual basis. As part of the detailed implementation of Alternative 2, wells HEX-10, M-3 and M-5 are screened in both the Upper and Middle Transmissive Units, will be removed to prevent any cross-contamination. Those wells that are removed will each be replaced with two monitoring wells, one completed in the Upper and one completed in the Middle Transmissive Units (MTU).

14.1.2.2 Petroleum Hydrocarbon Area: Alternative 2 provides for a deed restriction and continued monitoring of the area of petroleum hydrocarbon contamination. It provides for installation of a monitoring well near B1007 screened in the MTU. Previous monitoring has indicated that concentrations are stable and downgradient monitoring wells do not show evidence of benzene migrating from this area in the Upper Transmissive Unit (UTU). Additional downgradient monitoring will be provided by installing a well near HEX-14S to monitor the MTU. Natural processes will be relied on to attenuate benzene concentrations. These include biodegradation and dispersion.

14.1.2.3 Area with PCE Detections: Alternative 2 involves further refinement and

monitoring of the lateral extent of the area where PCE has been detected, and deed restrictions on groundwater use. Delineation of the lateral extent of the area where PCE has been detected will require access to properties to the west and northwest of the Hexcel Plant for sampling using the Hydro Punch or similar sampling technology. Monitoring will require installation of off-site monitoring wells. Additional soil sampling will be performed in the vicinity of the Rose Garden in an attempt to locate the source of the PCE.

14.1.2.4 Other Actions: Existing monitoring wells that are not essential for monitoring the progress of the remedial actions will be retained and used for groundwater level measurements only. These wells include: HEX-16S, HEX-17S, and HEX-18S. Chemical sampling of these wells will be discontinued unless groundwater flow patterns indicate that they are located in positions downgradient from known areas of contamination.

14.1.2.5 Contaminated soils generated during the RI and currently stored in drums on-site will be treated by soil venting on the surface, if necessary, to reduce concentrations to meet Federal and State land disposal restrictions. The soil venting will be performed in a manner to contain and treat all off-gas to meet Bay Area Air Quality Management District requirements. The treated soils will then be disposed of in an appropriate land fill. Ninety-five 55-gallon drums of soils are currently present on Site. Of these, 65 (approximately 12 cubic yards) may potentially contain soils with concentrations of organic compounds that require treatment.

14.1.2.6 Drummed development and purge water currently stored on-site will be pretreated, if necessary, and discharged directly to the industrial sewer. The volume of drummed water is about 600 gallons.

14.1.3 Alternative 3: Source Removal by In Situ Treatment

Alternative 3 consists of the monitoring and remedial design components of Alternative 2 coupled with removal of on-site sources of COCs by in situ treatment technologies (note: removal does not imply complete removal to background of COCs, rather a reduction in concentrations). It does not include the deed restrictions on groundwater use contained in Alternative 2. It contains the same provisions for treatment and disposal of drummed soil and water as Alternative 2.

14.1.3.1 Bldg. 19 Area: Alternative 3 consists of removing sources of organic compounds (acetone, MEK, and benzene) by in situ vapor extraction, soil aeration, and sparging to enhance aerobic biodegradation. This process will oxygenate the soil above the water table thus stimulating biodegradation by indigenous microorganisms of the organic COCs in the UTU. The process will also enhance

oxygen transfer to the saturated upper transmissive unit and further promote biodegradation. In the course of oxygenating the soils, the oxygen content of shallow groundwater will also be increased and concentrations of organic compounds of organic COCs will be decreased by aerobic biodegradation.

14.1.3.1.1 The process is also expected to lower arsenic concentrations by precipitating barium arsenate, by reducing the potential for organic complexation and promoting sorption and co-precipitation of arsenic with ferric and manganese hydroxides.

14.1.3.1.2 Natural attenuation will be relied on to reduce benzene concentrations in the MTU. Partial dewatering of the UTU may be required during wet portions of the year. If dewatering is performed, the water will be pretreated, if necessary, and discharged to the industrial sewer under Hexcel's existing industrial discharge permit.

14.1.3.1.3 Implementation of Alternative 3 will involve additional soil sampling to target the area of remediation and a soil venting pilot test. Off-gas treatment will be achieved by passing the gas through vapor-phase activated carbon. If the area of soil requiring remediation is found to be sufficiently small, excavation and on-site treatment with surface soil venting will also be considered.

14.1.3.2 Petroleum Hydrocarbon Area: Alternative 3 in the Petroleum Hydrocarbon Area will consist of in situ bioremediation and air sparging or flow enhancement to remove benzene and associated aromatic compounds, acetone, and MEK. Alternative 3 also includes installation of additional monitoring wells completed in the MTU. Implementation of Alternative 3 will involve additional soil sampling during the remedial design phase to target the area of remediation and a pilot test. Off-gas treatment will be achieved by passing the gas through vapor phase activated carbon.

14.1.3.2.1 The COCs are currently present in saturated, low-permeability sediments below the water table where they are not readily accessible to removal by conventional groundwater pumping or vapor extraction techniques. The in-situ techniques proposed in Alternative 3 are designed to physically and biologically remove benzene, acetone, and MEK from the low permeability sediments.

14.1.3.2.2 The in-situ technique involves injecting air into the MTU beneath the silty clay and creating an "air-pocket" beneath the clay. This air pocket will provide oxygen to degrade organic COCs in the MTU and will result in a flow of air up through the low permeability unit. The air flowing through contaminated, low permeability sediment will help in displacing non-aqueous

phase liquid hydrocarbons upward, vapor extract volatile hydrocarbons, such as benzene and, more importantly, provide oxygen for in-situ biodegradation.

14.1.3.2.3 The final design of the in-situ technique would be based on pilot tests and additional design studies.

14.1.3.3 Area with PCE Detections: Alternative 3 provides for source reduction by in-situ techniques along with the further investigation and remedial design described for Alternative 2. Groundwater quality in the off-site portion of the area where PCE has been detected will be monitored and natural processes, such as biodegradation, chemical degradation, and dispersion, relied on to attenuate concentrations. Implementation of Alternative 3 will involve additional soil sampling to target the area of remediation and pilot testing. Off-gas treatment will be achieved by passing the gas through vapor phase activated carbon. The source area will be located. If it is found to be in the unsaturated sediments above the water table, the source will be removed by vapor extraction. If the source is below the water table, it will be removed by sparging in a manner similar to that for the Petroleum Hydrocarbon Area.

14.1.4 Alternative 4: Source Removal and Capture of Groundwater Containing PCE

14.1.4.1 Alternative 4 consists of the same in-situ technologies for source removal as Alternative 3 with the addition of groundwater pumping to capture groundwater containing PCE during the period of remediation. It also includes the monitoring and further investigation components of Alternative 2. Calculations in the FS indicate that as little as 3 gpm would need to be pumped to capture groundwater containing PCE in the area where it has been detected.

14.1.4.2 Water pumped from the PCE-affected zone would be treated to the extent necessary to comply with the discharge requirements of the Livermore POTW. Final design of the pumping system would be based on delineation of the source and construction of a numerical groundwater flow model that accounts for variations in sediment structure and permeability.

14.1.5 Alternative 5: Recovery Pumping of On-site Sources

14.1.5.1 Alternative 5 relies on groundwater pumping to contain chemicals on the Hexcel property and to reduce source area concentrations. Water pumped from affected zones would be treated to the extent necessary to comply with the discharge requirements of the Livermore POTW. Calculations in the FS indicate that capture of the sources can be achieved by pumping as little as 2.5 gpm. Water from the capture wells would be treated to the extent necessary to meet discharge requirements to the industrial sewer. Additional treatment would consist of

air-stripping with off-gas treatment by vapor phase carbon.

14.1.6 Alternative 6: Containment Pumping of On-site Sources and Off-site Groundwater Containing PCE

14.1.6.1 Alternative 6 relies on groundwater pumping to control the off-site migration of PCE and to reduce source area concentrations in the same manner as Alternative 5. Water pumped from affected zones would be treated to the extent necessary to comply with the industrial discharge requirements of the Livermore POTW.

14.1.6.2 Calculations presented in the FS indicate that control of both on-site sources and off-site migration of PCE can be achieved by pumping eight wells at a total rate of 4.5 gpm. Capture of the off-site groundwater containing PCE is accomplished by pumping on the northern boundary of the HMP OU.

14.2 ADS OU

One alternative was developed in addition to the No Action Alternative.

14.2.1 Alternative 1: No Action

Alternative 1 is no remedial action and no monitoring. In essence, this alternative implies that the only change in soil and groundwater concentrations from current conditions will be as a result of natural processes and human activities, such as remedial pumping at the Intel Fab III facility, that are outside of the control of current property owners.

14.2.2 Alternative 2: Monitoring/Regrading/Deed Notification

Alternative 2 consists of monitoring of groundwater concentrations of hazardous constituents. It also provides for monitoring of subsurface methane concentrations and methane concentrations in any structure built in the future on the ADS OU. It includes a contingency for additional methane control measures, such as passive barriers or active recovery, if the need for such measures is indicated by the monitoring results. It also provides for a deed notification requiring any owner of the ADS OU to contact the Regional Water Quality Control, the Integrated Waste Management Board, and the City of Livermore Planning and Zoning Department prior to undertaking any activities that might encounter buried hazards. In addition, it includes a provision for regrading the surface to prevent ponding and excess infiltration through the cover.

14.2.2.1 Monitoring: Groundwater concentrations of hazardous organic and inorganic compounds and soil methane concentrations will be monitored. The

groundwater monitoring network consists of existing wells. Well P-10B has been free of groundwater contamination since it was installed during the RI and is not needed for water elevation monitoring. It will be properly abandoned. Methane monitoring will be required for any new structure built on the ADS OU.

14.2.2.2 Deed Notification: The deed notification will require any owner of the ADS OU to contact the Regional Water Quality Control Board, the Integrated Waste Management Board, and the City of Livermore Planning and Zoning Department prior to undertaking any activities that might encounter buried hazards or change of post-closure land use.

14.2.2.3 Regrading: A closed depression exists in the central portion of the solid waste area. Runoff accumulates in this area and in a few other shallow depressions; most of the runoff evaporates. The ADS OU will be regraded to prevent ponding and reduce infiltration. This regrading will involve approximately 6,000 $yd.^3$ of fill in the central depression and an additional 3,000 $yd.^3$ to bring the rest of the ADS OU to grade. All of the fill can probably be obtained from the former railroad bed on the north edge of the landfill. The properties of the on-site fill will be tested and this presumption verified. The fill will be compacted.

15. Summary of Evaluation Criteria

This section summarizes the evaluation criteria developed by EPA and used to compare the alternatives in the RI and FS Reports for the two Ous. The alternatives were evaluated in detail with respect to the nine criteria in the RI/FS Reports. Each alternative was also evaluated with respect to the six state law criteria set forth in Section 25356.1 of the California Health and Safety Code. A comparative analysis was completed in the RI/FS reports.

15.1 Overall Protection of Human Health and the Environment This criterion addresses whether a remedy provides adequate protection of human health and the environment.

15.2 Compliance with applicable or relevant and appropriate requirements (ARARs). This criterion addresses whether a remedy will meet all of the ARARs.

15.3 Long-term Effectiveness and Permanence This criterion refers to expected residual risk and residual chemical concentrations after cleanup goals have been met and the ability of a remedy to maintain reliable protection of human health and the environment over time.

15.4 Reduction of toxicity, mobility or volume through treatment This criterion refers to the anticipated performance of the treatment technologies a remedy may employ.

15.5 Short-term effectiveness This criterion addresses the period of time needed to achieve cleanup and any adverse impacts on human health and the environment that may be posed during the construction and implementation period, until cleanup goals are achieved.

15.6 Implementability This criterion refers to the technical and administrative feasibility of a remedy.

15.7 Cost This criterion includes estimated capital and operation and maintenance, usually presented in a 30-year present worth format.

15.8 Agency Acceptance This criterion addresses the agencies' acceptance of the selected remedy and any other agency comments.

15.9 Community Acceptance This criterion summarizes the public's general response to the alternatives.

16. Remedy Selection Rationale and Statutory Determinations

16.1 HMP OU

16.1.1 The alternatives evaluated in the FS for the HMP OU consisted of varying levels of soil treatment and groundwater monitoring with capture and/or treatment measures as necessary. The rationale for remedy selection is to protect human health and the environment. The selected remedy meets these criteria. Soil will be remediated so as to minimize leaching of chemicals to groundwater. The selected remedy complies with ARARs. In accordance with CERCLA § 121, 42 USCA § 9621, and the National Contingency Plan, 40 CFR Part 300, DTSC will waive any federal or state permitting requirements for the treatment, storage, and disposal of hazardous wastes that might otherwise apply to the activities contemplated as part of the approved remediation.

16.1.2 Each of the alternatives for the HMP OU was evaluated in terms of the nine criteria listed in Paragraph 15 and the six State criteria set forth in Section 25356.1 of the HSC. The costs of the remedial alternatives (except no-action) range from 1.2 to 2.2 million dollars. Based on the evaluation, Alternative 4 achieves all of the remedial goals in a timely manner. Alternative 6 also achieves the remedial goals, although in a longer time frame and is the most expensive. Alternatives 2, 3, and 5 will eventually achieve remedial goals but on a much longer time frame than Alternatives 4 and 6. Alternative 4 was selected because it reduces source concentrations in a timely manner, captures the off-site groundwater containing PCE, and is more cost-effective than Alternative 6.

16.2 ADS OU

16.2.1 The alternatives evaluated in the FS for the ADS OU consisted of no action and monitoring/regrading/deed notification. The rationale for remedy solution is to protect human health and the environment. The selected remedy meets these criteria. The selected remedy complies with ARARs and is consistent with EPA guidance in selecting

remedies for waste disposal units.

16.2.2 Each of the alternatives for the ADS OU was evaluated in terms of the nine criteria listed in Paragraph 15 and the six State criteria set forth in Section 25356.1 of the HSC. The cost of Alternative 2 is about 1 million dollars. Based on the evaluation, Alternative 2 achieves all of the remedial goals in a timely manner. Alternative 2 was selected because it accomplishes the remedial goals in a cost-effective manner.

16.2.3 Compliance with Chapter 15, Division 3, Title 23 of the California Code of Regulations.

16.2.3.1 Regulatory Status The ADS OU was an unregulated, non-classified, disposal site as described in the Remedial Investigation Report. A Report of Waste Discharge has not been submitted to the Board. The ADS OU has not previously met necessary Board requirements or received permits for construction, operation or closure pursuant to the policies of the Porter-Cologne Water Quality Control Act (Division 7, commencing with WC Section 13000), Title 23, CCR, Chapter 15 and Title 14, CCR, Division 7.

16.2.3.2 Site Characteristics The characterization of the contents of the ADS OU as presented in the Remedial Investigation Report and the Feasibility Study meets the definition of a nonhazardous solid waste. Actions taken pursuant to Chapter 15 shall comply with the requirements for a Class III waste management unit to the extent feasible.

16.2.3.3 Cover The existing cover over the ADS OU was constructed or placed at different times and no available record exists of when this work was performed (p. H-11, Remedial Investigation Report). The discharger believes that waste disposal ceased in 1979 and the existing cover was placed prior to April 1980. In 1989 additional soil was imported to raise existing grade in the eastern portion of the ADS OU.

16.2.3.4 Groundwater Monitoring The existing ADS OU is unlined and without a leachate collection and removal system. Existing conditions are such that there is less than 5 feet separation between the bottom of the waste and the highest anticipated groundwater elevation. An adequate groundwater monitoring program needs to be initiated pursuant to Section 2510(g) of Chapter 15. The monitoring program shall be in accordance with Article 5 of Chapter 15 to the extent feasible. If water quality impairment is detected and confirmed, additional portion(s) of Chapter 15 may be required by the Board.

16.2.3.5 Grading and Drainage The existing cover allows for ponding of surface water in depressions resulting in percolation into the underlying waste. The

average slope of the existing cover is 0.4%. There are no drainage ditches or culverts over the ADS OU or along its periphery (p. H-12, Remedial Investigation Report). Drainage from offsite sources needs to be directed around the ADS OU. The existing cover is inadequate with respect to grading (p. H-12, Remedial Investigation Report) and needs to be regraded and provided with adequate surface drainage systems. The ADS OU shall be graded and maintained to prevent ponding, provide proper surface drainage, and divert surface drainage from covered waste.

16.2.3.6 Financial Assurance An annual financial assurance letter that provides sufficient assurance funds are available for annual costs of monitoring and maintenance of the ADS OU will be required in order to assure that the ADS OU will not pose an adverse threat to the environment.

17. THE SELECTED FINAL REMEDY

17.1 HMP OU

The selected remedial action for the HMP OU is the remedy identified and described as "Alternative 4" in the FS and Regional Board's Proposed Plan Fact Sheet. Alternative 4, as discussed in detail in Finding 14.1.4., consists of removing sources of organic compounds (acetone, MEK, and benzene) by in-situ vapor extraction, soil aeration, and sparging to enhance aerobic biodegradation. The alternative would also include groundwater pumping to capture groundwater containing PCE during the period of remediation, monitoring and further delineation of the area where PCE has affected groundwater.

17.2 ADS OU

The selected remedial action for the ADS OU is the remedy identified and described as "Alternative 2" in the FS and Regional Board's Proposed Plan Fact Sheet. Alternative 2, as discussed in detail in Finding 14.2.2., consists of monitoring of groundwater for hazardous constituents, monitoring of subsurface methane concentrations and a contingency for additional methane control measures if necessary. It also provides for a deed notification identifying areas with buried waste and regrading the surface to prevent ponding and excess infiltration through the cover.

18. Deed Notifications

18.1 HMP OU

A deed restriction shall be placed on the HMP OU restricting drilling of wells or use of groundwater until such times that cleanup standards have been achieved. Wells related to remedial activities shall be exempted from the restriction.

18.2 ADS OU

A deed notification will be placed on the portion of the ADS OU that overlies the portion of the ADS OU that potentially contains buried hazards. This deed notification will require any owner of the property to contact the Board, the Integrated Waste Management Board, and the City of Livermore Planning and Zoning Department prior to undertaking any activities that might encounter buried hazards.

19. CLEANUP STANDARDS

19.1 Soil

The SRA did not identify chemical concentrations as posing a direct risk to human health. Soil cleanup standards for total volatile organic compounds will not exceed 1 ppm.

19.2 Groundwater

The cleanup standards for groundwater are listed below:

- Arsenic: 50 ppb (Cal DOHS MCL)
- Benzene: 1 ppb (Cal DOHS MCL)
- Tetrachloroethene: 5 ppb (Cal DOHS MCL)
- Acetone: 770 ppb (US EPA PRG April 21, 1993)
- Methyl Ethyl Ketone: 1,100 ppb (US EPA PRG April 21, 1993)
- Barium: (Due to high background concentrations, barium will be monitored as part of the remedy. The Cal DOHS MCL for barium is 1,000 ppb.)

19.3 Risk Associated with Cleanup Standards

The SRA divided the groundwater chemicals of concern into carcinogens and non-carcinogens. The SRA identified benzene as a carcinogen. The lifetime cancer risk associated with the 1 ppb cleanup standard for benzene is 1×10^{-6}. IRIS identifies PCE as a carcinogen and reports that the excess cancer risk associated with the 5 ppb MCL is 1.4×10^{-5}. The SRA did not identify arsenic, barium, acetone, or MEK as carcinogens. The non-carcinogenic hazard indices for chronic exposure to these constituents in drinking water at concentrations equal to the cleanup standards are:

- arsenic - 5

- barium - 0.4
- acetone - 1
- methyl ethyl ketone - 1

19.4. Uncertainty in Achieving Clean-up Standards

The cleanup standards set forth in this remedial action are intended to restore groundwater to its beneficial uses. Based on information obtained during the RI and on a careful analysis of all remedial alternatives, the Board believes that the selected remedies will achieve the cleanup standards. However, studies suggest that in-situ remedial technologies and groundwater extraction will not be, in all cases, completely successful in reducing contaminants to health-based levels in the aquifer zones. The Board recognizes that operation of the selected extraction and treatment system may indicate the technical impracticability of reaching health-based groundwater quality standards using this approach. If it becomes apparent, during implementation or operation of the system, that contaminant levels have ceased to decline and are remaining constant at levels higher than the cleanup standards, that standard and the remedy may be re-evaluated.

19.5. Future Changes to Clean-up Standards

The Board recognizes that a number of conditions may affect the performance of the in-situ vapor extraction system and groundwater extraction system. These factors may include: (1) the heterogeneity of the shallow and intermediate zones; (2) the transmissivity of the aquifers; (3) the sustainable yield from the aquifers; (4) the adsorption of chemicals onto, and the rate of desorption from, vadose and aquifer soils and aquitard materials; and (5) the possible existence of sources in off-site areas, the precise location of which cannot be identified. The Board further recognizes that, as a result of these factors or other factors, achievement of all the remedial standards set forth in this Order may not be practicable. Consequently, this Order calls for periodic evaluation of the remedial standards and consideration of adjustment of the remedial standards for portions or all of the Site if achievement of such standards is no longer practicable.

If new information indicates clean-up standards cannot be attained or can be surpassed, the Board and EPA will decide if further final clean-up actions, beyond those completed, shall be implemented at this Site. If changes in published and adopted health criteria (i.e. MCLs), administrative requirements, Site conditions, or remediation efficiency occur, the dischargers will submit an evaluation of the effects of these changes on clean-up standards.

The Board recognizes that the dischargers have already performed extensive investigative and remedial work and are being ordered hereby to perform additional remedial tasks. It is in the public interest to have the dischargers undertake such remedial actions promptly and without prolonged litigation or the expenditure of public funds. The Board recognizes

that an important element in encouraging the dischargers to invest substantial resources in undertaking such remedial actions is to provide the dischargers with reasonable assurances that the remedial actions called for in this Order will be the final remedial actions required to be undertaken by the dischargers. On the other hand, the Board also recognizes its responsibility to protect water quality, public health, and the environment and that future developments could indicate that some additional remedial actions may be necessary.

The Board has considered and balanced these important considerations, and has determined that the remedial actions ordered herein represent the Board's best, current judgment of the remedial actions to be required of the dischargers. The Board will not require the dischargers to undertake additional remedial actions with respect to the matters previously described herein unless: (1) conditions on the Site, previously unknown to the Board, are discovered after adoption of this Order, or (2) new information is received by the Board, in whole or in part after the date of this Order, and these previously unknown conditions or this new information indicates that the remedial actions required in this Order may not be protective of public health and the environment. The Board will also consider technical practicality, cost-effectiveness, State Board Resolution No. 68-16 and other factors evaluated by the Board in issuing this Order in determining whether such additional remedial actions are appropriate and necessary.

20. DATA VALIDATION

Development of the Board's final remedy was based on the Board's evaluation of water quality data. Data has been validated using EPA validation guidance. The Board finds that there is sufficient acceptable data to make cleanup decisions.

21. COMMUNITY RELATIONS

Community Relations activities conducted in conjunction with the FS/RAP have included the following:

21.1 Distributing the Proposed Plan Fact Sheet to all addresses in the vicinity of the Site and local government officials.

21.2 Placing the FS/RAP in the local information repository located in the Livermore Public Library;

21.3 Publishing notices in the Valley Times and Tri-Valley Herald announcing the proposed final RAP and opportunity for public comment at the Board hearing of July 21, 1993 in Oakland, and announcing the opportunity for public comment at an evening public meeting at Jackson Elementary School, 554 Jackson Avenue, Livermore on July 22, 1993. A presentation of the final cleanup plan was made at the July 21, 1993 Board public hearing and the July 22, 1993 evening public meeting. The comment period was from July 12 to August 12, 1993.

22. ADMINISTRATIVE RECORD

The Administrative Record was prepared in accordance with EPA Guidance, has been made available for public review and for review by interested parties, and provides full documentation for the recommendations of staff and decisions by the Board. The record has been updated periodically. Copies of significant reports and an index were available for public access at the Livermore Public Library. The full Administrative Record is available for public access at the office of the San Francisco Bay RWQCB.

23. POTENTIAL RESPONSIBLE PARTIES

23.1 HMP OU

23.1.1 Hexcel is identified as potentially responsible party (PRP) under the federal Superfund (CERCLA/SARA) for the HMP OU. However, nothing in these findings or Order shall limit any PRP's right and ability to identify other PRPs for the purposes of cost recovery under any applicable laws.

23.2 ADS OU

23.2.1 Hexcel, the Smiths and F&P are identified as potentially responsible parties (PRPs) under the federal Superfund (CERCLA/SARA) for the ADS OU. However, nothing in these findings or Order shall limit any PRP's right and ability to identify other PRPs for the purposes of cost recovery under any applicable laws.

24. LEAD AGENCY

Pursuant to the South Bay Multi-Site Cooperative Agreement and the South Bay Ground Water Contamination Enforcement Agreement, entered into on May 2, 1985 (as subsequently amended) by the Board, EPA and DTSC, the Board has been acting as the lead agency for the Site. EPA is expected to agree with the selected remedy and issue a Record of Decision following adoption by the Board of the final remedy for the Site. The Board will continue as appropriate to regulate the dischargers' remediation and administer enforcement actions in accordance with CERCLA, as amended by SARA, the California Water Code, Health and Safety Code, and regulations adopted thereunder.

25. In 1989, the Regional Board adopted resolution #89-39 "Sources of Drinking Water" which defines a groundwater basin as suitable or potentially suitable for domestic or municipal use as that which; 1) has a total dissolved solids (TDS) content of less than 3,000 mg/l, and, 2) has a minimum transmissivity such that one well can pump at least 200 gallons a day. The groundwater basin at the Site falls within this category.

26. The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on December 17, 1986. The Basin Plan contains water quality objectives and

beneficial uses for the Amador-Livermore Valley and contiguous surface and ground waters.

27. The existing and potential beneficial uses of the groundwater underlying and adjacent to the Site include:

    a. industrial process water supply;
    b. industrial service water supply;
    c. municipal and domestic water supply; and
    d. agricultural water supply.

28. The existing and potential beneficial uses of Arroyo Seco include:

    a. groundwater recharge;
    b. recreation;
    c. warm and cold fresh water habitat;
    d. wildlife habitat; and
    e. fish migration and spawning.

29. The Board's Resolution No. 88-160 encourages maximum feasible reuse of extracted groundwater from remediation projects. The Board will consider the feasibility of reclamation, reuse or discharge to a publicly owned treatment works (POTW) of extracted groundwater.

30. The dischargers have caused or permitted, and threatens to cause or permit waste to be discharged or deposited where it is or probably will be discharged to waters of the State and creates or threatens to create a condition of pollution or nuisance.

31. This action is an order to enforce the laws and regulations administered by the Board. This action is categorically exempt from the provisions of the CEQA pursuant to Section 15321 of the Resources Agency Guidelines.

32. The Board has notified the dischargers and interested agencies and persons of its intent under California Water Code Section 13304 to prescribe Site Cleanup Requirements for the Site, and has provided them with the opportunity for a public hearing and an opportunity to submit their written views and recommendations.

33. The Board, in a public meeting heard and considered all comments pertaining to the Site.

IT IS HEREBY ORDERED, pursuant to Section 13304 of the California Water Code and Section 25356.1 of the California Health and Safety Code, that the dischargers shall cleanup and abate the effects described in the above findings as follows:

A. PROHIBITIONS

1. The discharge of wastes or hazardous materials in a manner which will degrade water quality or adversely affect the beneficial uses of the waters of the State is prohibited.

2. Further significant migration of pollutants through subsurface transport to waters of the State is prohibited.

3. Activities associated with the subsurface investigation and cleanup which will cause significant adverse migration of pollutants are prohibited.

B. CLEANUP SPECIFICATIONS

1. The storage, handling, treatment or disposal of soil or groundwater containing pollutants shall not create a nuisance as defined in Section 13050(m) of the California Water Code.

2. The dischargers shall conduct monitoring activities as outlined in the accepted sampling plan, approved by the Executive Officer to define the current local hydrogeologic conditions, and the lateral and vertical extent of soil and groundwater pollution. Should monitoring results show evidence of pollutant migration, additional characterization of pollutant extent may be required.

3. Pursuant to Water Code Section 13304(c), the dischargers are hereby notified that the Board is entitled to and may seek reimbursement for all reasonable staff oversight costs incurred relating to cleanup of waste on this Site, abating the effects thereof, or taking other remedial action.

C. PROVISIONS

1. The dischargers shall comply with this Order upon adoption and the dischargers shall comply with the Prohibitions and Specifications described above, in accordance with the following tasks and compliance time schedules:

1.1 HMP OU

a. TASK: REMEDIAL DESIGN AND REMEDIAL ACTION WORKPLAN
DUE DATE: November 1, 1993

Description: The dischargers shall submit a workplan acceptable to the Executive Officer containing an outline and a schedule for completion of all elements of the selected remedy including but not limited to: the remedial design, construction, operation and maintenance (O&M), and groundwater

monitoring.

b. TASK: PROPOSED DEED RESTRICTION
DUE DATE: NOVEMBER 30, 1993

Description: The dischargers shall submit a proposed deed restriction acceptable to the Executive Officer. The restriction shall restrict use of groundwater on the HMP OU property until cleanup standards are accomplished.

c. TASK: DEED RESTRICTIONS RECORDATION
DUE DATE: 90 days after approval by the Executive Officer of proposed deed restriction/notification (TASK b.)

Description: The Dischargers shall submit to the Board a copy of the notarized and properly recorded deed restriction document for the HMP OU as described in task (b).

d. TASK: NON-BINDING ALLOCATION OF RESPONSIBILITY (NBAR)
DUE DATE: JANUARY 31, 1994

Description: The dischargers shall propose an NBAR acceptable to the Executive Officer for the HMP OU.

1.2 ADS OU

The tasks for the ADS OU are pursuant to Title 23, CCR, Chapter 15 and Title 14, CCR, Division 7 and are equivalent to the requirements for a Class III waste management unit to the extent feasible.

a. TASK: REMEDIAL DESIGN AND REMEDIAL ACTION WORKPLAN
DUE DATE: November 1, 1993

Description: The dischargers shall submit a workplan acceptable to the Executive Officer containing an outline and a schedule for completion of all elements of the selected remedy including but not limited to: the remedial design, construction, operation and maintenance (O&M). Elements of the remedy such as the methane monitoring program, contingency plan for methane migration, grading plan, and post-earthquake plan may be submitted as individual documents or combined into the design, construction, and O&M documents for the entire OU. A proposal for a deed notification will be submitted as a separate task under this Order.

b. TASK: FINANCIAL ASSURANCE
DUE DATE: November 1, 1994

Description: The discharger shall submit to this Board and to the California Integrated Waste Management Board, an annual financial assurance letter that provides sufficient assurance funds are available for annual costs of monitoring and maintenance of the ADS OU.

c. TASK: GROUNDWATER MONITORING PLAN.
DUE DATE: JANUARY 31, 1994

Description: The discharger shall submit to the Board, for approval, an adequate groundwater monitoring program pursuant to Article 5 of Chapter 15 to the extent feasible.

d. TASK: PROPOSED DEED NOTIFICATION
DUE DATE: NOVEMBER 30, 1993

Description: The dischargers shall submit a proposed deed notification acceptable to the Executive Officer. The notification shall notify all present and future owners, tenants or other users of the ADS OU that a designated the portion of the property overlies the landfill. The deed notification shall require any owner, tenants or other user of the ADS OU to contact the Board, the Integrated Waste Management Board, and the City of Livermore Planning and Zoning Department prior to undertaking any activities that might encounter buried hazards.

e. TASK: DEED NOTIFICATION RECORDATION
DUE DATE: 90 days after approval of proposed deed notification (TASK d.)

Description: The Dischargers shall submit to the Board a copy of the notarized and properly recorded deed notification document for the ADS as described in Task (d).

f. TASK: PROPOSED DEED RESTRICTION
DUE DATE: NOVEMBER 30, 1993

Description: The dischargers shall submit a proposed deed restriction acceptable to the Executive Officer. The restriction shall restrict use of groundwater on the ADS OU property.

g. TASK: DEED RESTRICTIONS RECORDATION

DUE DATE: 90 days after approval by the Executive Officer of proposed deed restriction (TASK f.)

Description: The Dischargers shall submit to the Board a copy of the notarized and properly recorded deed restriction document for the ADS as described in Task (f).

h. TASK: NON-BINDING ALLOCATION OF RESPONSIBILITY (NBAR)
DUE DATE: JANUARY 31, 1994

Description: The dischargers shall propose an NBAR acceptable to the Executive Officer for the ADS OU.

2. The dischargers shall submit to the Regional Board acceptable reports on compliance with the requirements of this Order that contain descriptions and results of work and analyses performed. It is not the Board's intent to duplicate any reports due under other Orders therefore any reports due concurrently under this Order may be combined. These reports shall include those prescribed below:

2.1 The dischargers shall regularly submit reports to the Board on results of groundwater monitoring. The reports shall be submitted in accordance with the schedule set forth in the Remedial Design report and acceptable to the Executive Officer. All compliance and monitoring reports shall include at least the following:

1) Tabulated results of water quality sampling analyses for all groundwater monitoring wells specified in the SAP, and updated groundwater contour maps based on these results.

2) A cumulative tabulation of all well construction details, water level measurements and updated piezometric maps based on these results.

3) Reference diagrams and maps including geologic cross sections describing the hydrogeologic setting of the Site, and appropriately scaled and detailed base maps showing the location of all groundwater monitoring wells and extraction wells, and identifying adjacent facilities and structures.

3. ON AN ANNUAL BASIS, technical reports on the progress of compliance with all requirements of this Order shall be submitted to the Board, commencing with the report due January 31, 1994, and covering the previous year. Annual reports may include any monitoring reports due concurrently. The progress reports shall include, but need not be limited to, progress on the Site investigation and remedial actions, operation of final remedial actions and/or systems, and the feasibility of meeting groundwater

and soil cleanup standards.

4. If the dischargers may be delayed, interrupted or prevented from meeting one or more of the completion dates specified in this Order, the dischargers shall promptly notify the Executive Officer. If, for any reason, the dischargers are unable to perform any activity or submit any document within the time required under this Order, they may make a written request for a specified extension of time. The extension request shall include a justification for the delay, and shall be submitted in advance of the date on which the activity is to be performed or the document is due. The Board staff may propose an amendment to the Order and bring the matter to the Board for consideration.

5. All technical plans, specifications, reports and documents shall be signed by or stamped with the seal of a registered geologist, registered civil engineer, or certified engineering geologist.

6. All samples shall be analyzed by State certified laboratories, or laboratories accepted by the Board, using approved EPA methods for the type of analysis to be performed. All laboratories or the consultant shall maintain quality assurance/ quality control records for Board review for a period of six years.

7. The dischargers shall maintain in good working order, and operate, as efficiently as possible, any facility or control system installed to achieve compliance with the requirements of this Order.

8. Copies of all correspondence, reports, and documents pertaining to compliance with the requirements of this Order shall be provided to the following agencies:

   a. Regional Water Quality Control Board
   b. Alameda County Flood Control District, Zone 7
   c. City of Livermore
   d. U.S. Environmental Protection Agency, Region IX, H-6-5

9. The dischargers shall permit the Board or its authorized representative, in accordance with Section 13267(c) of the California Water Code:

   a. Entry upon premises in which any pollution sources exist, or may potentially exist, or in which any required records are kept, which are relevant to this Order.
   b. Access to copy any records required to be kept under the terms and conditions of this Order.

c. Inspection of any monitoring equipment or methodology implemented in response to this Order.

d. Sampling of any groundwater or soil as part of any investigation or remedial action program undertaken by the dischargers.

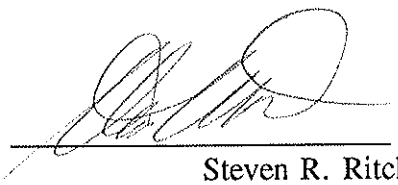
10. The dischargers shall file a report in a timely manner on any changes in Site occupancy and ownership associated with the facility described in this Order.

11. If any hazardous substance is discharged in or on any waters of the state, or discharged and deposited where it is, or probably will be discharged in or on any waters of the state, the dischargers shall report such discharge to this Regional Board, at (510) 286-1255 on weekdays during office hours from 8 a.m. to 5 p.m., and to the Office of Emergency Services at (800) 852-7550 during non-business hours. A written report shall be filed with the Regional Board within five (5) working days and shall contain information relative to: the nature of waste or pollutant, quantity involved, duration of incident, cause of spill, Spill Prevention, Control, and Countermeasure Plan (SPCC) in effect, if any, estimated size of affected area, nature of effect, corrective measures that have been taken or planned, and a schedule of these activities, and persons/agencies notified.

12. This Site Cleanup Order rescinds SCO 91-165.

13. The Board will review this Order periodically and may revise the requirements when necessary.

I, Steven R. Ritchie, Executive Officer, do hereby certify that the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on September 15, 1993.



Steven R. Ritchie
Executive Officer

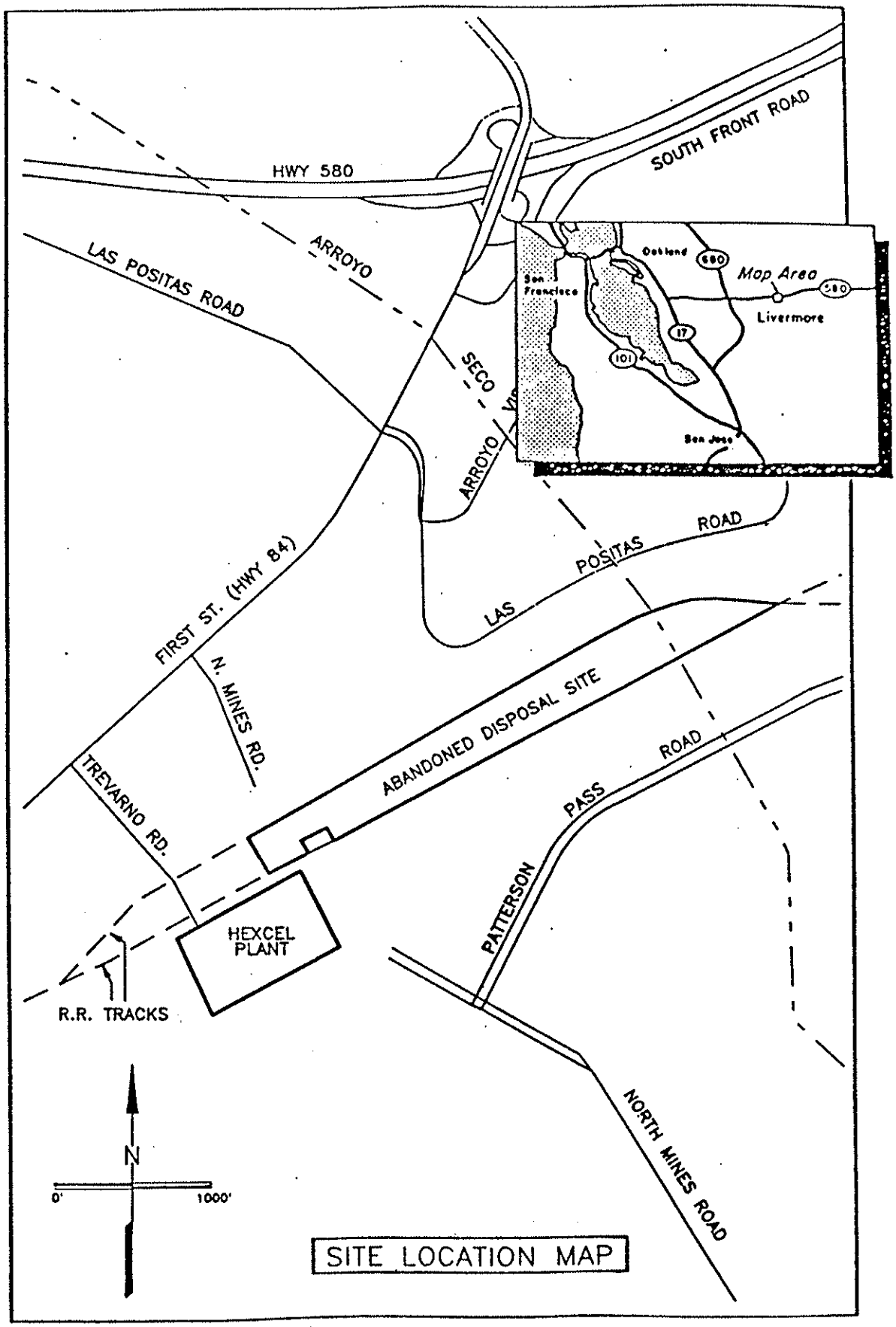


Figure 1 Site location map